

Cotton breeding in the Brazilian Cerrado

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ABSTRACT

Brazilian Cerrado has 2.064.676 km², representing 24.42% of the Brazilian territory and including part of the following states: Mato Grosso do Sul, Mato Grosso, Goiás, Tocantins, Bahia, Piauí, Maranhão, Minas Gerais, Rondônia and Federal District. Of these 206 million hectares, 127 million hectares are available to agriculture and only 47 million are currently in use. During the 2001/2002 harvest, the Brazilian Cerrado produced 83.4% of the total Brazilian cotton lint harvest. The tillage system is completely mechanized, including ginning on farms. 98.5% of the 524 000 ha area that is under cotton cultivation have been developed under rain conditions. A breeding program for the Cerrado was established in 1989. It started in Mato Grosso State and expanded to Goiás and Bahia States. Subsequently several new varieties were developed. Embrapa developed eleven cotton varieties for Brazilian Cerrado conditions, viz., CNPA ITA 90, CNPA ITA 92, BRS ITA 96, CNPA ITA 97, BRS ANTARES, BRS FACUAL, BRS AROEIRA, BRS IPÊ, BRS SUCUPIRA, BRS ITAÚBA and BRS CEDRO. Currently, induced by the increasing Cerrado cotton yield, other companies owning cotton varieties in the Brazilian market like IAC, IAPAR and COODETEC, as well as transnational companies (AVENTIS/BAYER, SYNGENTA, MDM/DELTAPINE, STONEVILLE) started to select germplasm to use in breeding programs to Brazilian Cerrado. To obtain better results and lower production costs, all varieties must be tillaged, changing culture exploitation. The rotation of soybean, corn and cotton within three cycles by year makes it possible to avoid diseases and pests, besides the higher yield and lower costs due to this land use system.

Introduction

The Cerrado region has an area of 2 064 676 km², representing 24% of the Brazilian territory and including parts of the following states: Mato Grosso do Sul, Mato Grosso, Goiás, Tocantins, Bahia, Piauí, Maranhão, Minas Gerais, Rondônia and Federal District. Hunderd and twenty-seven of the 206 million hectares are available for agriculture, but only 47 million are currently in use. During the 2001/2002 harvest, the Brazilian Cerrado produced 83.4% of the Brazilian cotton. The production system is completely mechanized, including ginning on farms (Freire, 1998). 98.5% of the 524 000 ha cotton cultivated area have been developed under rain conditions.

Experimental procedure

In 1989, a breeding program for the Cerrado was established, which began in Mato Grosso State and expanded to Goiás and Bahia States, and several new cotton varieties were developed.

The main characteristics required by cotton growers for new varieties in the Cerrado are the following: high productivity (200 to 300 @/ha); high lint percent (38 to 41%); normal to long vegetative period (150 to 180 days); and high fiber quality, including: fineness from 3.9 to 4.2 micronaire; strength above 28 g/tex; maturity above 82%; short fiber content less than 7%; fiber length above 28.5 mm; nep count less than 250. Other characteristics are type 4.5 to 6.0, with reflectance (Rd) above 70% and yellowness degree (+b) shorter than 10.0 and with sugar index lower than 0.40%. They must also have multiple resistances to virus diseases (blue diseases, cotton anthocyanosis and common mosaic), and other diseases like angular leaf spot, witch's broom, leaf spots caused by *Alternaria* sp. or *Stemphylium solani* and Fusarium-nematode disease complex. Also, in this region, all insect pests usually found in association with cotton cultivation have been observed, viz., aphids and other lepidopteran, coleopteran and hemipteran pests.

The varieties must have good responses to the application of modern inputs, including chemical fertilizer, insecticides, herbicides, fungicides, plant growth regulators as well as good adaptation to mechanical harvest. They must have resistance to drought occurring usually in Goiás, Bahia, Maranhão and Piauí States.

Results

To obtain better results and lower production costs, all varieties must be grown in rotation systems. The rotation of soybean, corn and cotton within three cycles by year makes it possible to avoid diseases and pests increase, besides the higher yield and lower costs due to this land use system.

Embrapa developed eleven varieties for the Brazilian Cerrado conditions: CNPA ITA 90, CNPA ITA 92, BRS ITA 96, CNPA ITA 97, BRS ANTARES, BRS FACUAL, BRS AROEIRA, BRS IPÊ, BRS SUCUPIRA, BRS ITAÚBA and BRS CEDRO. It is a result of twelve years of continuous research using mainly methods of intra-population selection breeding and genealogical selection. These methods are applied on large basis populations, produced of germplasms from E.U.A, France and the Northwest of Brazil.

Currently, the increasing Cerrado cotton area has motivated other Brazilian companies, such as IAC, IAPAR, COODETEC and transnational companies (Bayer Seeds, Syngenta, MDM/Deltapine, Stoneville) to select germplasm and develop breeding programs in

the Brazilian Cerrado. The producers have been demanding transgenics cotton varieties to use in a strategy to reduce input costs. Nevertheless, there are strong efforts by syndicates and environmental interest groups to postpone the release and cultivation of such varieties.

Conclusions

The Brazilian Cerrado is the main expansion area of Brazilian agribusiness and has an expansion potential of 30 million hectares; the Cerrado region produces 83.4% of the Brazilian cotton, with excellent fiber quality and competitive production costs with traditional export market; Embrapa Cotton, in partnership with a foundation of support to research and using private funds, has a breeding program that developed

eleven cotton varieties adapted to the Cerrado region.

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